



# WATER SUMMARY UPDATE

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## A snapshot of water resource trends for the 2023 Water Year

### 2023 Water Year Summary

#### OVERVIEW – WATER YEAR ENDS – THIRD DRY YEAR IN A ROW

The “Water Year” is defined as the period between October 1st and September 30th. After October 1 precipitation benefits the upcoming growing season, and winter snow can be the primary source of water runoff into streams during the next calendar year for many parts of the United States. The 2023 Water Year ended on September 30th, 2023 and for the third year in a row precipitation was below normal. Since October 1, 2020 the precipitation deficit in Iowa is 15.67 inches. As a result of this shortfall in precipitation, drought conditions have continued to worsen across the state.

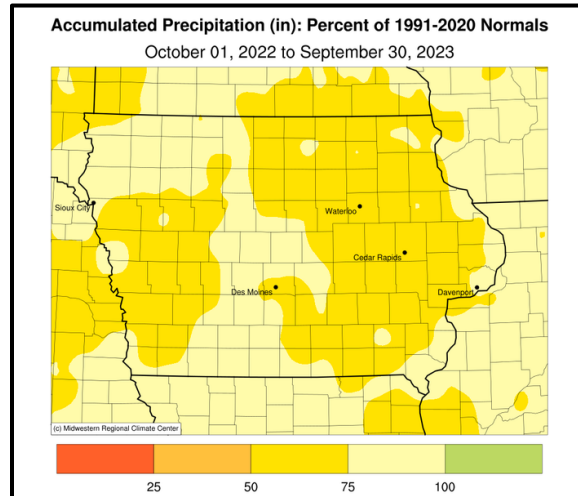
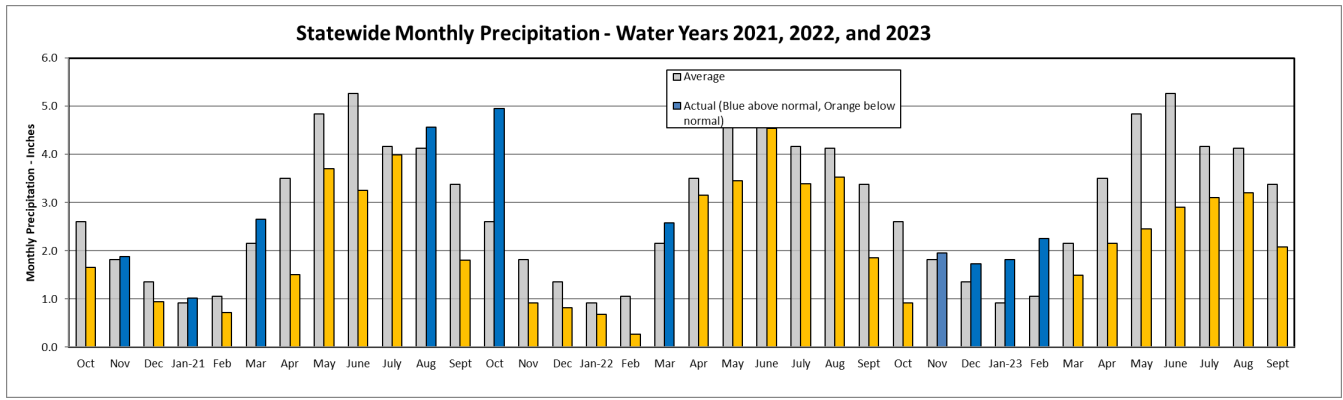
#### WATER YEAR PRECIPITATION AND TEMPERATURE

The 2023 Water Year ended on September 30th, 2023, and was the third water year in a row that saw below normal precipitation. The 2023 Water Year ended with a preliminary precipitation total for the 12-month period of 26.08 inches, or 9.47 inches below normal. Preliminary temperatures averaged 49.0 degrees, which is 0.6 degree above the 1991-2020 climatological normal for Iowa. Preliminary rankings show this was the 13th driest water year, and ties 1893, 2021 and 2022 as the 47th warmest Water Year among 151 years of statewide records; 2011 was drier and 2016 was warmer.

All of Iowa’s reporting stations measured precipitation deficits for the water year, with area in southwestern, northeastern, and east-central Iowa measuring 12 to 15 inches or more below the 30-year normal. Much of the state observed deficits of six to nine inches. Iowa averaged 30.8 inches of snowfall, 6.4 inches below normal.

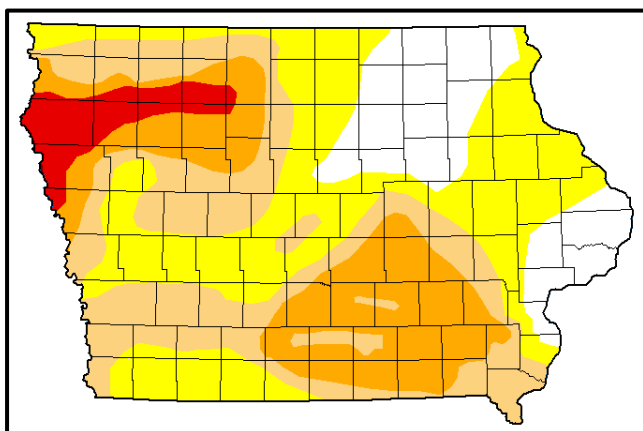
Notable months/seasons during the water year include the 11th wettest February, the 4th wettest winter, the 21st driest May, the 16th driest spring, the 18th driest June and the 17th driest summer; Iowa’s statewide observational period of record dates back to 1872.

The graph below shows the monthly rainfall of the last three water years. Blue bars are above normal monthly rainfall, and orange bars are below normal monthly rainfall. Over the past three years 26 of the 36 months have been below normal for precipitation, and only one summer month, August 2021, had above normal precipitation.

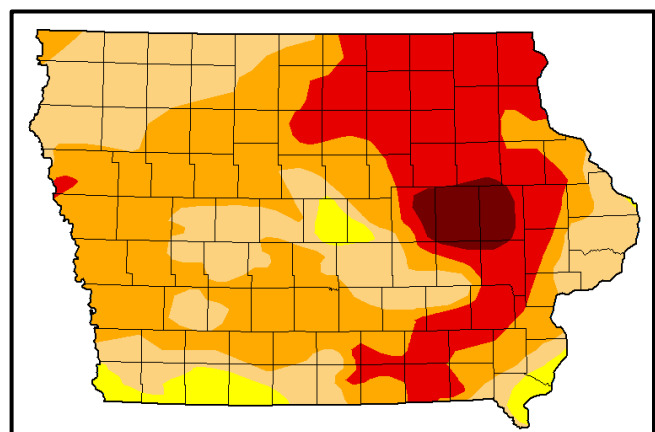


**DROUGHT MONITOR**

The US Drought Monitor (USDM) provides a simplified way to look at regional and statewide trends in drought conditions. Over the course of the 2023 Water Year drought conditions remained in drought, with some improvement in the spring months of 2023, but then deterioration as the state moved into the fall. Over the course of the water year the area of concern shifted from the northwest part of Iowa in eastern Iowa. The driest part of the state remains the area of Linn, Benton, and Tama Counties, where a D4 – Exceptional Drought designation remains.



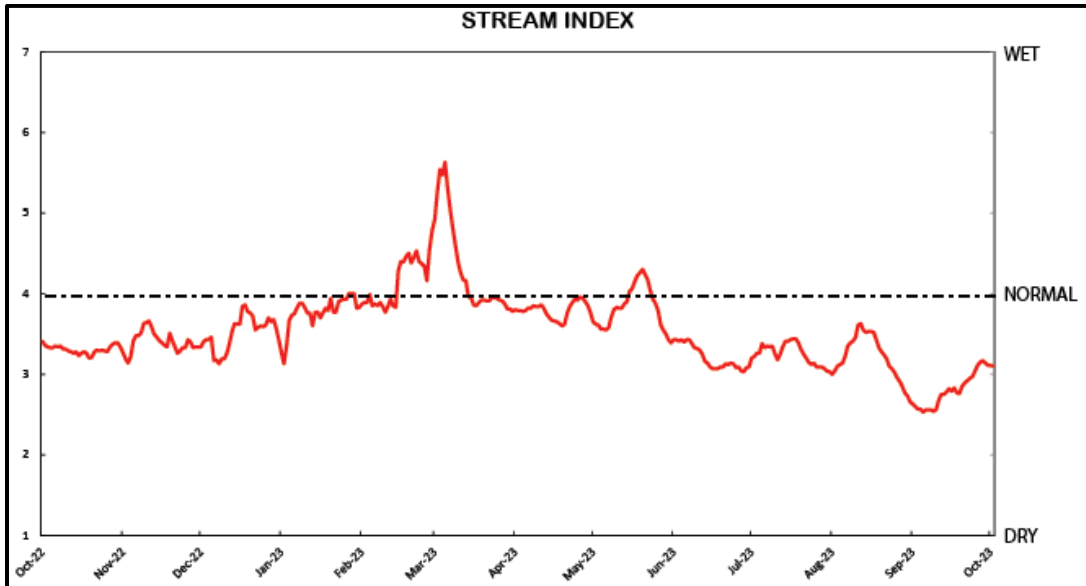
USDM – October 4, 2022



USDM – October 3, 2023

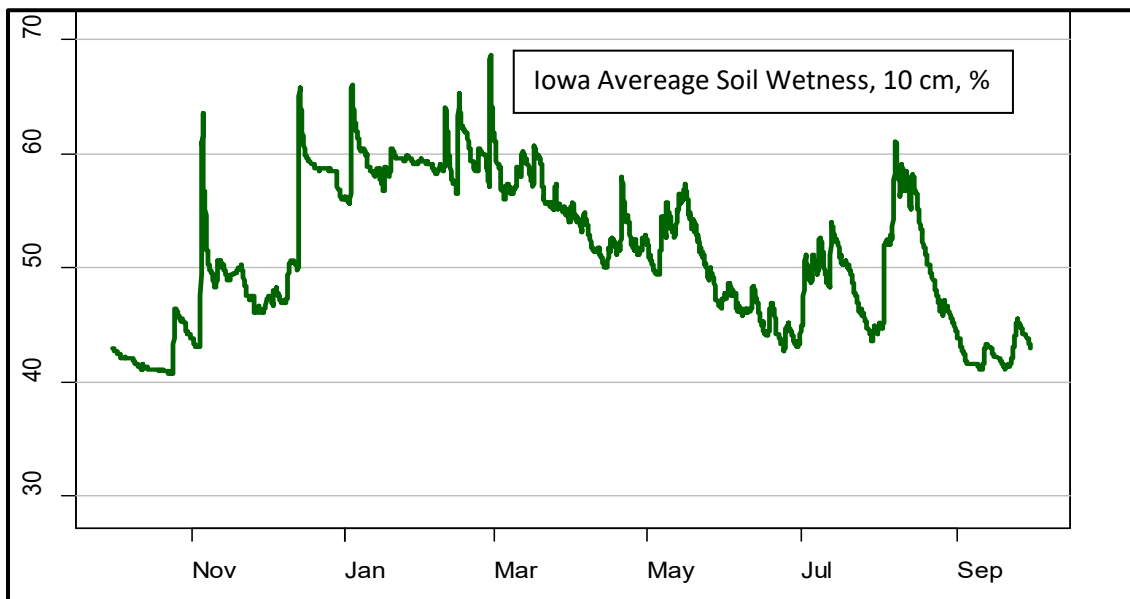
## STREAMFLOW

The U.S. Geological Survey (USGS) streamflow index is an average of streamflows at all USGS stream gauges across the state compared to the average streamflow at all those points at that time. This index provides a simplified way of looking at streamflows throughout the year. It does, however, smooth out any abnormally high or low flows that may exist in a small number of watersheds in the state. It is also important to note that average streamflow is typically much lower in the winter than in the spring and early summer. The Streamflow Index shows that average streamflow has been close to below normal for much of the year, other than a brief time in the spring. Since the start of summer, the index has been declining.



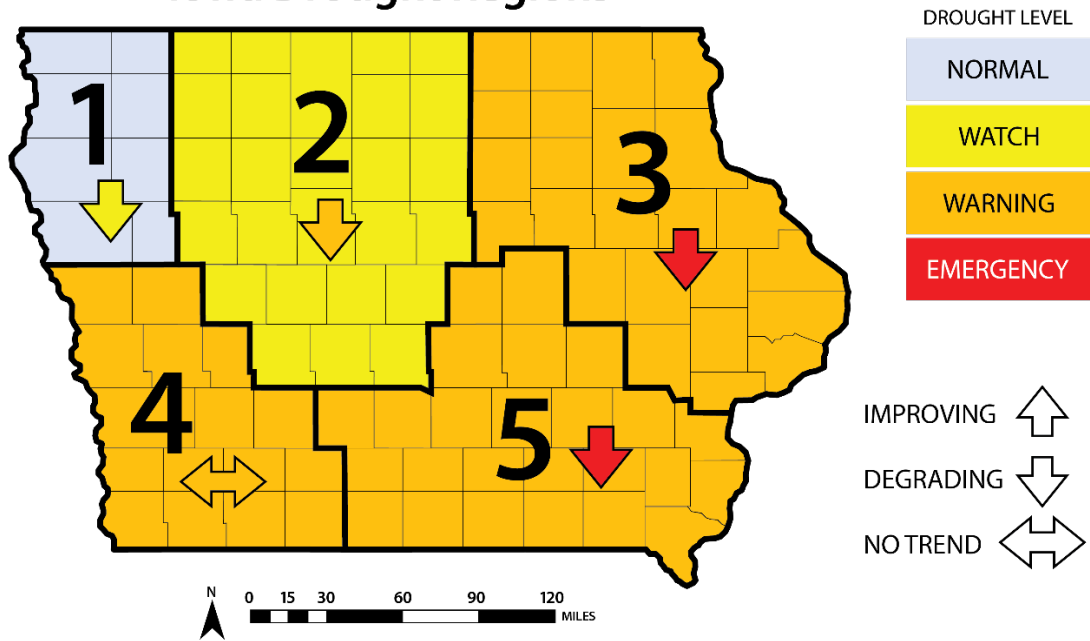
## SOIL MOISTURE

Soil moisture remains dry across most of the state. This graph shows the change in soil moisture throughout the Water Year. Soil moisture was at its wettest in the winter months, and then has declined over the growing season. Rains which fell in July and August helped to replenish soil moisture levels, but overall soils remain dry throughout much of the state.



# A snapshot of water resource trends for September 2023

## Iowa Drought Regions



### PRECIPITATION AND TEMPERATURE – SEPTEMBER 2023

Iowa’s preliminary statewide average precipitation totaled 2.10 inches, or 1.38 inches below normal. Widespread areas of one to three inch deficits were found across the state, while isolated pockets of wetter than normal conditions were found in central and northeastern Iowa. Monthly precipitation totals ranged from 0.57 inch in Rock Valley to 6.87 inches in Waukon. The preliminary statewide average temperature was 67.3 degrees, 3.6 degrees warmer than normal. Sioux City Airport observed the month’s high temperature of 102 degrees on the 2nd, 22 degrees above normal. Mason City Airport reported the month’s low temperature of 36 degrees on the 13th, 14 degrees below normal.

### STREAM FLOW – SEPTEMBER 2023

The Iowa Geological Survey calculates a Standardized Streamflow Index, or SSI for the drought plan regions in Iowa each month. SSI is a metric that compares current streamflow against the historical record to determine how far away the current streamflow value is from the river’s historical mean observed on the same date. SSI values typically range from 0 (normal flow) to -3, which indicates the current streamflow is extremely dry. For September, the SSI for each drought region are:

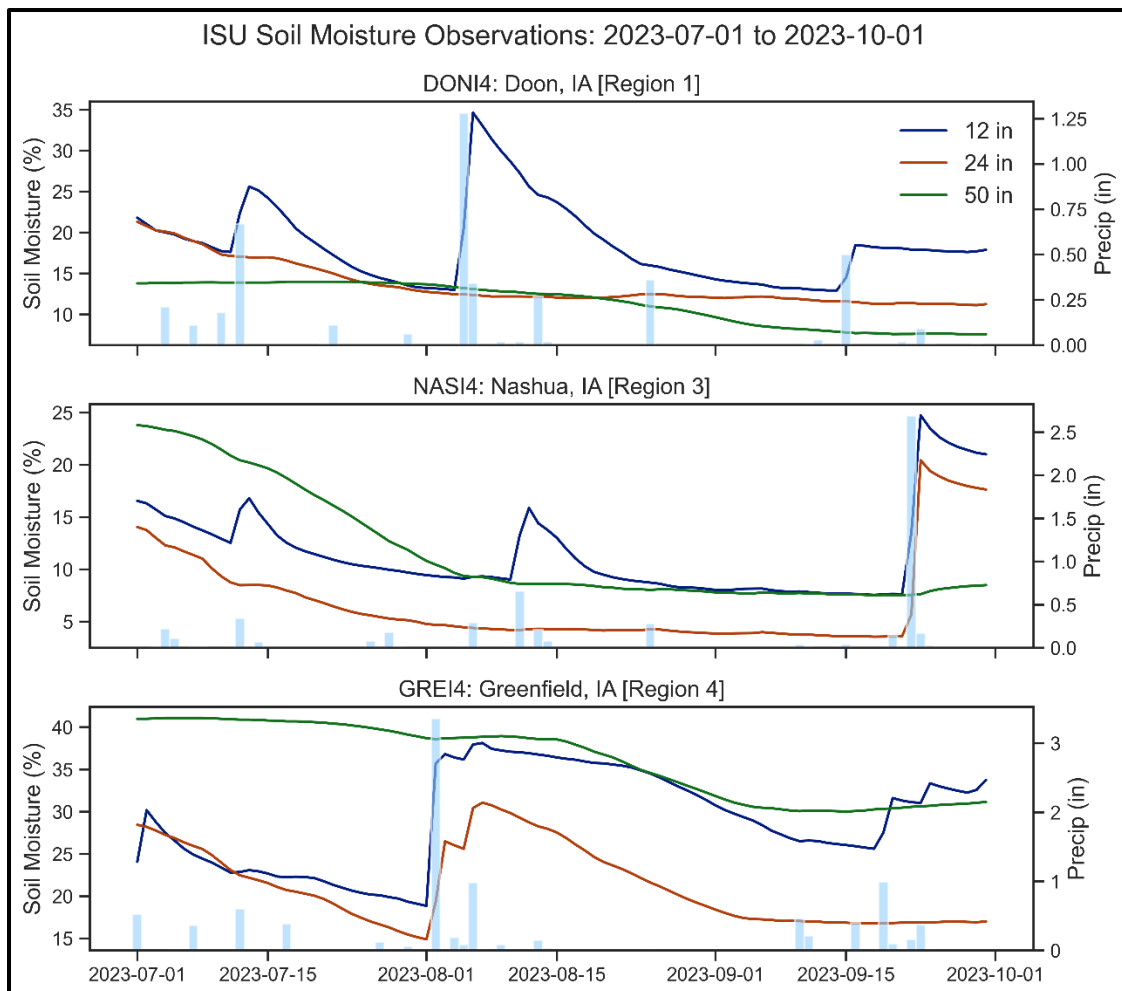
Drought Region	30-Day SSI	IDP Classification ↑ = improving ↓ = degrading ↔ = no trend
1	-1.36	Normal ↓
2	-1.36	Drought Watch ↔
3	-1.13	Drought Watch ↓
4	-1.70	Drought Warning ↔
5	-0.77	Drought Watch ↓

During August, the USGS notes that streamflow conditions across most of the state remained below normal, with a few areas in much below-normal conditions. The areas where flows are much below normal correspond to the Drought Plan Regions listed above.

### SOIL MOISTURE - SEPTEMBER 2023

During the last month, shallow soil moisture has transitioned from dry conditions in western and eastern Iowa to average conditions. Soil moisture at deep layers of soil remains similar to last month, except in eastern Iowa where it transitioned from dry to average soil saturation. Soil moisture obtained from NASA satellite products show average conditions across all of the state.

The following are three graphs that show soil moisture levels at three locations for July, August, and September. These graphs are from Doon (NW Iowa), Nashua (NE Iowa) and Greenfield (West Central Iowa). These graphs show the impact of rainfall on shallow soil moisture levels, but also show how quickly soil moisture returns to dry conditions after rain. This is indicative of the underlying dryness present in many parts of Iowa. The first two graphs illustrate the significant dryness in deeper soils, as shown by the green line indicating 50 inch depth.

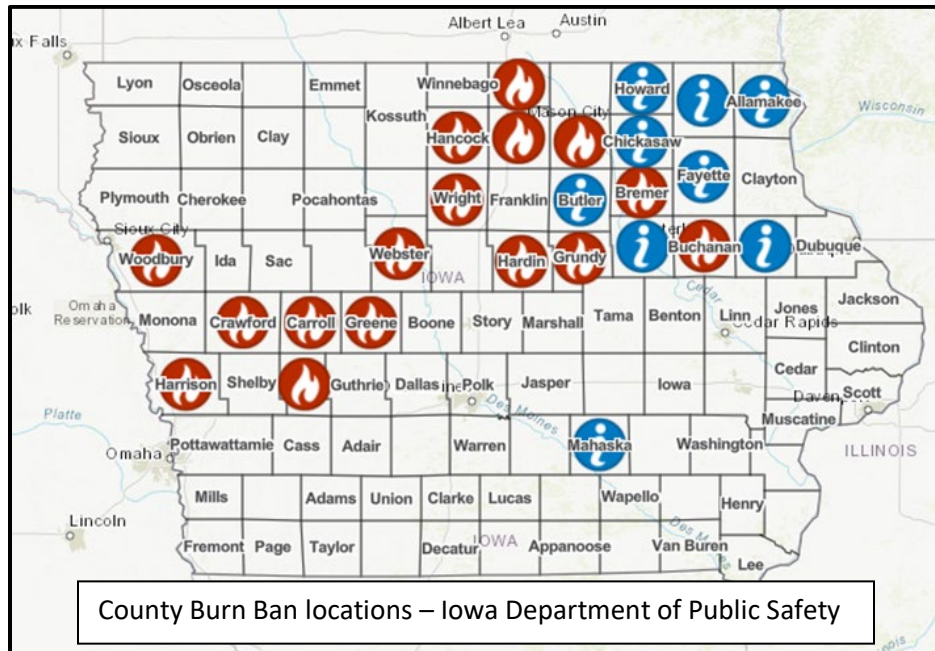


### AREAS OF DROUGHT CONCERN - SEPTEMBER 2023

Timely rainfall in NE Iowa in September helped to reduce the drought concern for that part of the state. While the large area of D4 – Exceptional Drought was removed, a smaller area remains for parts of Tama and Benton Counties. Significant drought concerns remain for those counties and the surrounding area. Without normal to

above normal rainfall this fall, eastern Iowa in general, and those counties in particular, could face a Drought Warning or even Drought Emergency. The fall months are a time of reduced water demand, which helps to alleviate some concern. However, timely normal to above normal rainfall and snow is needed in the fall and winter months to reduce the impacts of drought in 2024.

Current drought conditions have resulted in a number of county burn bans, and there are reports of voluntary and mandatory water restrictions in a limited number of communities in Iowa.



**ADDITIONAL INFORMATION**

For additional information on the information in this Water Summary Update please contact any of the following:

- General Information, Tim Hall, Iowa DNR . . . . . [Tim.Hall@dnr.iowa.gov](mailto:Tim.Hall@dnr.iowa.gov) 515-452-6633
- Monthly Climate Information, Justin Glisan, IDALS . . . . . [Justin.Glisan@iowaagriculture.gov](mailto:Justin.Glisan@iowaagriculture.gov) 515-281-8981
- Stream Flow, Dan Christiansen, USGS . . . . . [dechrist@usgs.gov](mailto:dechrist@usgs.gov) 319-358-3639
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- Shallow Groundwater, Greg Brennen, IGS . . . . . [greg-brennan@uiowa.edu](mailto:greg-brennan@uiowa.edu) 319-335-4465
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